ACOUSTICAL SITE ASSESSMENT
SHOREES PROPERTY – TPM 21054R
SAN DIEGO, CA

Lead Agency:

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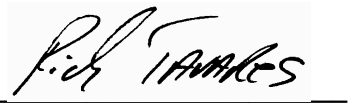

San Diego County Certified Acoustical Engineer

ISE Project #08-045
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ACRONYMS/GLOSSARY OF TERMS AND ACOUSTICAL THEORY

Acronyms and Glossary of Terms

ADT	Average Daily Trips
ANSI	American National Standards Institute
a.m.	ante meridian
B.S.	Bachelor of Science (*Baccalaureatus Scientiæ*)
CA	California
Cal/OSHA	California Occupational Safety and Health Administration
CALVENO	California Vehicle Noise Emission Number
CEQA	California Environment Quality Act
CCR	California Code Regulations
CNEL	Community Noise Equivalent Level
dB	Decibels
dBA	A-weighted sound level (decibels)
EIT	Engineer in Training
EPE	Estimated Position Error
GPS	Global Positioning System
Hz	Hertz or Cycles per Second
i.e.	id est (that is)
ISE	Investigative Science & Engineering, Inc.
L10	A-weighted sound levels exceeded 10 percent of the measurement period
L50	A-weighted sound levels exceeded 50 percent of the measurement period
L90	A-weighted sound levels exceeded 90 percent of the measurement period
Ldn	Day-Night Average Sound Level
Leq	Equivalent sound level
Leq-h	Equivalent sound level per hour
Lmax	Maximum noise level
Lmin	Minimum noise level
M.S.	Master of Science (*Magister Scientiæ*)
ML	Monitoring location
MPH	Miles per hour
MSL	Mean Sea Level
Ph.D.	Doctor of Philosophy (*Philosophiæ Doctor*)
PL	Property line
p.m.	post meridian
SPL	Sound pressure level

Acoustical Definitions

Sound waves are linear mechanical waves. They can be propagated in solids, liquids, and gases. The material transmitting such a wave oscillates in the direction of propagation of the wave itself. Sound waves originate from some sort of vibrating surface. Whether this surface is the vibrating string of a violin or a person's vocal cords, a vibrating column of air from an organ or clarinet, or a vibrating panel from a loudspeaker, drum, or aircraft, the sound waves generated are all similar. All of these vibrating elements alternatively compress the surrounding air on a forward movement and expand it on a backward movement.

There is a large range of frequencies within which linear waves can be generated, sound waves being confined to the frequency range that can stimulate the auditory organs to the sensation of hearing. For humans this range is from about 20 Hertz (Hz or cycles per second) to about 20,000 Hz. The air transmits these frequency disturbances outward from the source of the wave. Sound waves, if unimpeded, will spread out in all directions from a source. Upon entering the auditory organs, these waves produce the sensation of sound. Waveforms that are approximately periodic or consist of a small number of periodic components can give rise to a pleasant sensation (assuming the intensity is not too high), for example, as in a musical composition.

Noise, on the other hand, can be represented as a superposition of periodic waves with a large number of components and is generally defined as unwanted or annoying sound that is typically associated with human activity and which interferes with or disrupts normal activities. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise, the perceived importance of the noise and its appropriateness in the setting, the time of day, and the sensitivity of the individual hearing the sound.

Airborne sound is a rapid fluctuation of air pressure above and below atmospheric levels. The loudest sounds that the human ear can hear comfortably are approximately one trillion (or $1x10^{12}$) times the acoustic energy that the ear can barely detect. Because of this vast range, any attempt to represent the acoustic intensity of a particular sound on a linear scale becomes unwieldy. As a result, a logarithmic ratio originally conceived for radio work known as the decibel (dB) is commonly employed[1].

A sound level of zero “0” dB is scaled such that it is defined as the threshold of human hearing and would be barely audible to a human of normal hearing under extremely quiet listening conditions. Such conditions can only be generated in anechoic or “dead rooms”. Typically, the quietest environmental conditions (extreme rural areas with extensive shielding) yield sound levels of approximately 20 decibels. Normal speech has a sound level of approximately 60 dB. Sound levels above 120 dB roughly correspond to the threshold of pain.

The minimum change in sound level that the human ear can detect is approximately 3.0 dBA[2]. A change in sound level of 10 dB is usually perceived by the average person as a doubling (or halving) of the sounds loudness[3]. A change in sound level of 10 dB actually represents an approximate 90 percent change in the sound

[1] A unit used to express the intensity of a sound wave. This level is defined as being equal to 20 times the common logarithm of the ratio of the pressure produced by a sound wave of interest to a ‘reference’ pressure wave (which is defined as 1 micro Pascal measured at a distance of 1 meter).

[2] Every 3 dB equates to a 50% of drop (or increase) in wave strength, therefore a 6 dB drop/increase = a loss/increase of 75% of total signal strength and so on.

[3] This is a subjective reference based upon the nonlinear nature of the human ear.

intensity, but only about a 50 percent change in the perceived loudness. This is due to the nonlinear response of the human ear to sound.

As mentioned above, most of the sounds we hear in the environment do not consist of a single frequency, but rather a broad band of frequencies differing in sound level. The intensities of each frequency add to generate the sound we hear. The method commonly used to quantify environmental sounds consists of determining all of the frequencies of a sound according to a weighting system that reflects the nonlinear response characteristics of the human ear. This is called "A" weighting, and the decibel level measured is called the A-weighted sound level (or dBA). In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve.

Although the A-weighted sound level may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a conglomeration of sounds from distant sources that create a relatively steady background noise in which no particular source is identifiable. For this type of noise, a single descriptor called the Leq (or equivalent sound level) is used. Leq is the energy-mean A-weighted sound level during a measured time interval. It is the 'equivalent' constant sound level that would have to be produced by a given source to equal the average of the fluctuating level measured. For most acoustical studies, the monitoring interval is generally taken as one-hour and is abbreviated *Leq-h*.

To describe the time-varying character of environmental noise, the statistical noise descriptors L10, L50, and L90 are commonly used. They are the noise levels equaled or exceeded during 10 percent, 50 percent, and 90 percent of a stated time. Sound levels associated with the L10 typically describe transient or short-term events, while levels associated with the L90 describe the steady state (or most prevalent) noise conditions. In addition, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the maximum and minimum measured sound level (Lmax and Lmin) indicators. The Lmin value obtained for a particular monitoring location is often called the *acoustic floor* for that location.

Finally, another sound measure employed by the State of California and the County of San Diego is known as the Community Noise Equivalence Level (CNEL) is defined as the "A" weighted average sound level for a 24-hour day. It is calculated by adding a 5-decibel penalty to sound levels in the evening (7:00 p.m. to 10:00 p.m.), and a 10-decibel penalty to sound levels in the night (10:00 p.m. to 7:00 a.m.) to compensate for the increased sensitivity to noise during the quieter evening and nighttime hours.

EXECUTIVE SUMMARY

The findings contained within this *Acoustical Site Assessment* for the proposed Shorees Property TPM 21054R project site indicate that the identified noise sensitive areas (i.e. backyards) would be impacted by the adjacent roadway system. A proposed mitigation plan discussed in *Section 2.2 Predicted Traffic Noise Impact Assessment of Noise Sensitive Land Uses* of this report will mitigate sound levels to 60 dBA CNEL.

Additionally, our findings indicate that once the building design is finalized the proposed project must demonstrate compliance with the CCR Title 24 abatement threshold.

1.0 INTRODUCTION

1.1 Existing Site Characterization

The project site consists of 13.91 acres located within the County of San Diego, California. Dehesa Road borders the project site to the south. Dehesa Road provides regional access to the project site via State Route 54 (SR-54) as is shown in Figure 1 on the following page.

The project site currently resides as mostly undisturbed open area with vegetation scattered intermittently across the site and one existing residential structure. Elevations across the entire property range from approximately 665 to 894 feet above mean sea level (MSL). A project site map with topography is shown in Figure 2 on Page 6 of this report.

1.1.1 Project Description

The proposed development plan calls for the subdivision of one parcel into four residential parcels. The individual parcels will range from 2.35 gross acres to 5.91 gross acres with driveway access for all parcels from Dehesa Road. The proposed site plan can be seen in Figure 3 on Page 7 of this report.

FIGURE 1: Project Vicinity Map (ISE 9/08)

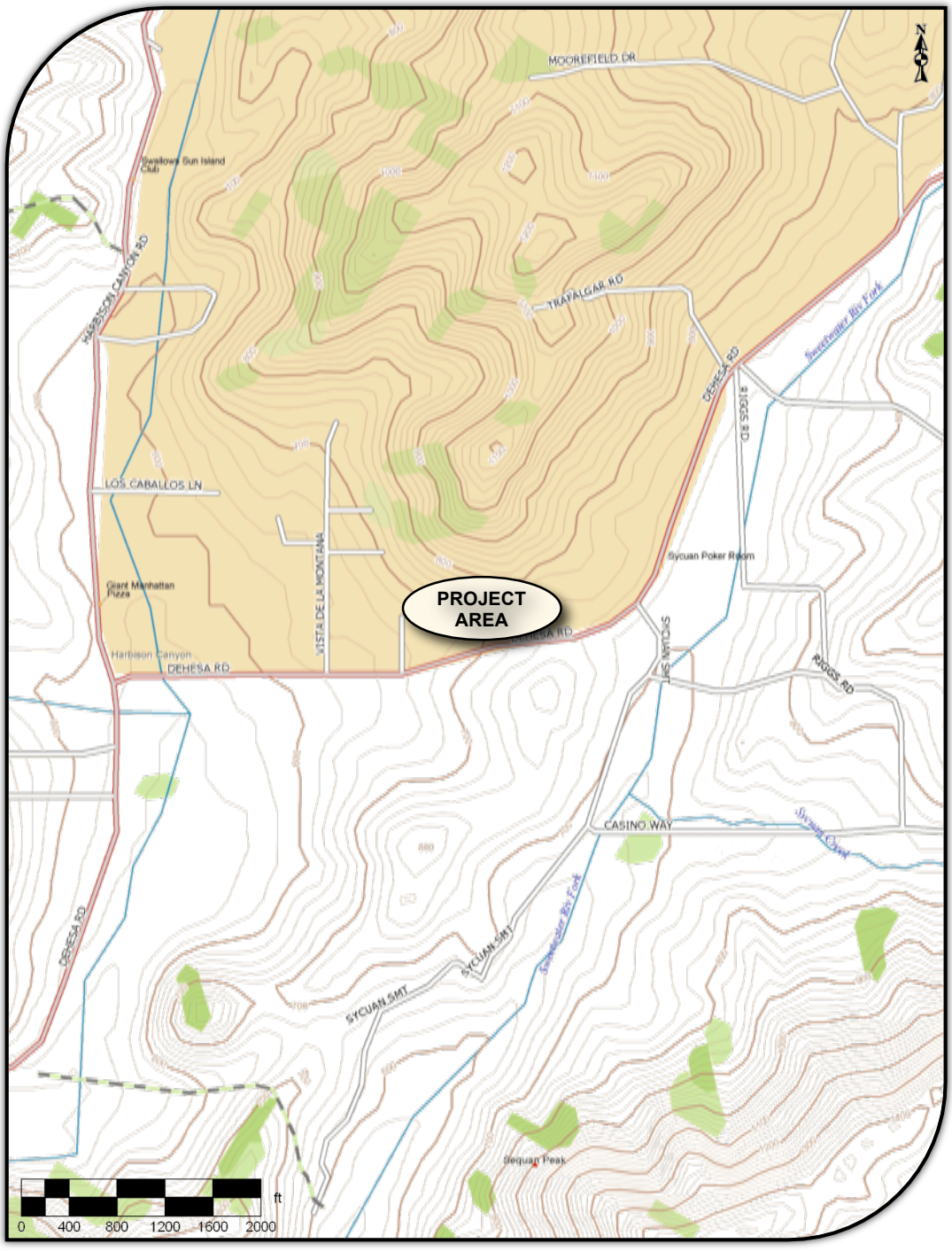


FIGURE 2: Project Site Location Map w/ Topography (ISE 9/08)

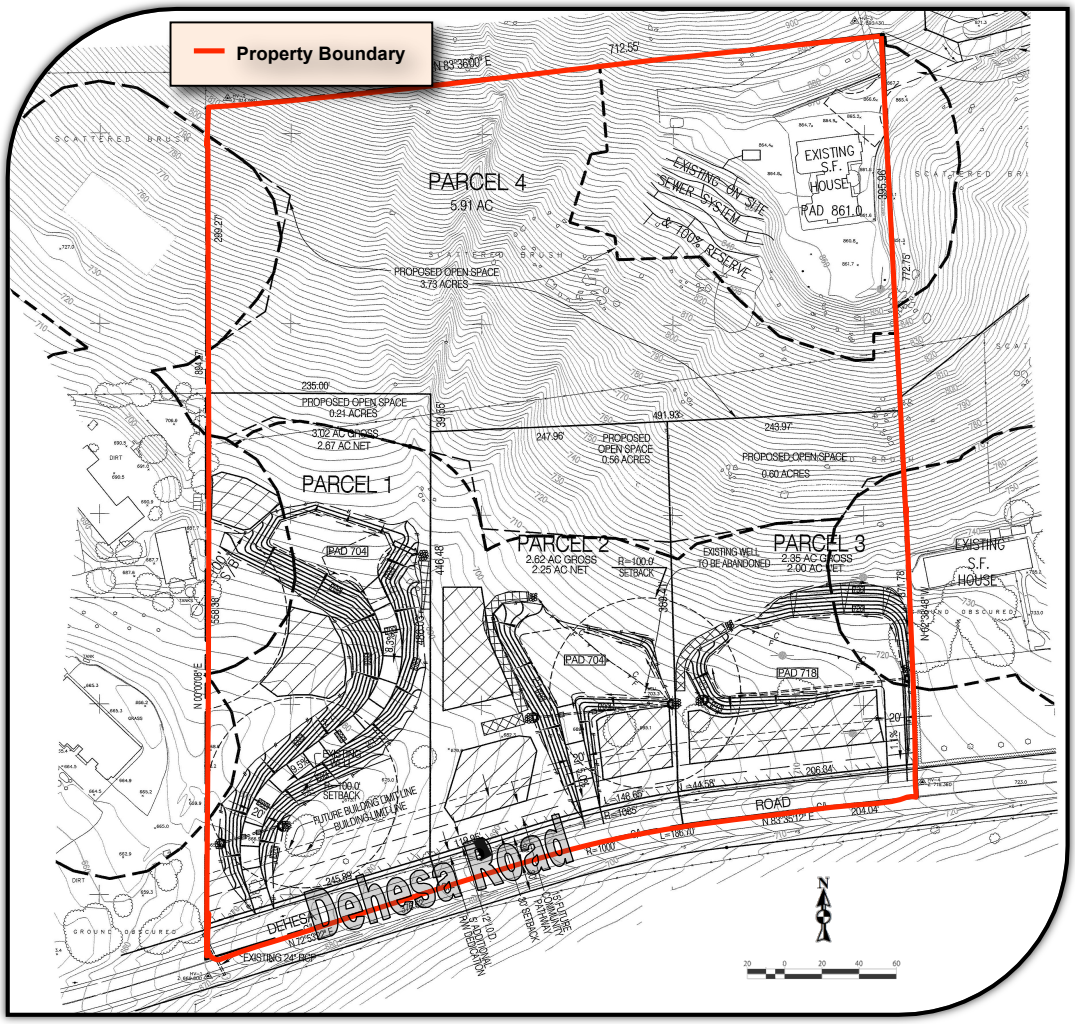


FIGURE 3: Proposed Site Plan – Shorees Property TPM 21054R (Site Design, Inc 7/08)

1.2 APPLICABLE SIGNIFICANCE CRITERIA

1.2.1 Vehicular/Transportation Noise Impact Thresholds

Transportation noise levels, such as those produced by vehicles traveling to and from the project site, are governed under Policy 4b of the *County of San Diego's Noise Element of the County's General Plan*.[4] The relevant sections of the Noise Element are cited below:

> Since exterior community noise equivalent levels (CNEL) above 60 decibels and/or interior CNEL above 45 decibels may have an adverse effect on public health and welfare, it is the policy of the County of San Diego that:
>
> 1. Whenever it appears that new *development* may result in any (existing or future) *noise sensitive land use* being subject to noise levels of CNEL equal to 60 *decibels (A)* or greater, an acoustical analysis shall be required.
> 2. If the acoustical analysis shows that noise levels at any *noise sensitive land use* will exceed CNEL equal to 60 decibels, modifications shall be made to the *development* which reduce the *exterior noise* level to less than CNEL of 60 *decibels (A)* and the *interior noise* level to less than CNEL of 45 *decibels (A)*.[5]
> 3. If modifications are not made to the *development* in accordance with paragraph 2 above, the *development* shall not be approved unless a finding is made that there are specifically identified overriding social or economic considerations which warrant approval of the development without such modification; provided, however, if the acoustical study shows that sound levels for any noise sensitive land use will exceed a CNEL equal to 75 *decibels (A) even* with such modifications, the *development* shall not be approved irrespective of such social or economic considerations.
>
> Definitions, Notes and Exceptions
>
> *"Decibels (A)"* refers to A-weighted sound levels as noted on page VIII-2 within the Element.
>
> *"Development"* means any physical development including but not limited to residences, commercial, or industrial facilities, roads, civic buildings, hospitals, schools, airports, or similar facilities.
> "*Exterior noise*":
>
> (a) For single family detached dwelling projects, "exterior noise" means noise measured at an outdoor living area which adjoins and is on the same lot as the dwelling, and which contains at least the following minimum area:

[4] *As revised July 2006.*

[5] **Action Program 4b1:** Recommend programs to soundproof buildings or redevelop areas where it is impossible to reduce existing source noise to acceptable levels.

Action Program 4b2: Study the feasibility of extending the application of Section 1092, California Administrative Code dealing with noise insulation standards to single-family dwellings, and incorporating higher standards for reduction of exterior noise intrusion into structures.

Action Program 4b3: Require present and projected noise level data to be included in Environmental Impact Reports. Designs to mitigate adverse noise impacts shall also be used.

(i) Net lot area up to 4,000 sq. ft.: 400 square feet.
(ii) Net lot area 4,000 sq. ft. to 10 ac.: 10% of net lot area.
(iii) Net lot area over 10 ac.: 1 ac.

(b) For all other projects, "exterior noise" means noise measured at all exterior areas, which are provided for group or private usable, *open space* purposes.

(c) For County road construction projects, the exterior noise level due to vehicular traffic impacting a noise sensitive area should not exceed the following values:

(i) Federally funded projects: The Noise standard contained in applicable Federal Highway Administration Standards.

(ii) Other projects: 60 *decibels (A),* except if the existing or projected noise level without the project is 58 decibels (*A*) or greater, a 3 *decibel* (*A*) increase is allowed, up to the maximum permitted by Federal Highway Administration Standards.

"Group or Private Usable Open Space" shall mean: Usable open space intended for common use by occupants of a development, either privately owned and maintained or dedicated to a public agency, normally including swimming pools, recreation courts, patios, open landscaped areas, and greenbelts with pedestrian walkways and equestrian and bicycle trails, but not including off-street parking and loading areas or driveways (Group Usable Open Space); and usable open space intended for use of occupants of one dwelling unit, normally including yards, decks and balconies (Private Usable Open Space).

"Interior noise": The following exception shall apply: For rooms which are usually occupied only a part of the day (schools, libraries, or similar), the interior one-hour average sound level, due to noise outside, should not exceed 50 *decibels (A)*.

"Noise sensitive land use" means any residence, hospital, school, hotel, resort, library or any other facility where quiet is an important attribute of the environment.

1.3 EXISTING ENVIRONMENTAL SETTING

1.3.1 Existing Conditions Field Survey

A Quest Model 2900 ANSI Type 2 integrating sound level meter was used as the data collection device. The meter was mounted to a tripod five feet above ground level in order to simulate the noise exposure of an average-height human being. Two short-term sound level measurements, denoted as Monitoring Locations ML 1 and -2, are shown in Figure 4 below.

FIGURE 4: Ambient Onsite Monitoring Locations – Shorees Property 21054R (ISE 9/08)

The first meter location (ML 1) was located in the southeastern portion of the site roughly 105 ft to the north of Dehesa Road. The second meter location (ML 2) was in the southwest portion of the site roughly 120 feet northwest of Dehesa Road. The monitoring

was done in this manner in order to obtain an estimate of the worst-case existing onsite noise during typical peak hour traffic conditions.

The measurements were performed on September 3, 2008. All monitoring sites were spatially logged using a geographic positioning system (GPS) in order to maintain horizontal and vertical control. All equipment was calibrated before testing at ISE's acoustics and vibration laboratory.[6]

1.3.2 Ambient Sound Measurement Results

Testing conditions during the monitoring period were sunny with an average barometric pressure reading of 29.76 in-Hg, an average westerly wind speed of 0-1 miles per hour (MPH) and an approximate mean temperature of 80 degrees Fahrenheit. The results of one-hour sound level monitoring are shown in Table 1 below. The values for the energy equivalent sound level (Leq), the maximum and minimum measured sound levels (Lmax and Lmin), and the statistical indicators L10, L50, and L90, are given for each monitoring location.

Measurements collected at the monitoring locations ML 1 and ML 2 reflect the typical sound levels associated with the community setting with existing adjacent roadway activities. The hourly average sound levels (or Leq-h) recorded over the monitoring period ranged between 59.4 dBA at ML 1 and 52.7 dBA at ML 2. The dominant noise source was peak hour traffic along Dehesa Rd.

TABLE 1: Measured Ambient Sound Levels – Shorees Property TPM 21054R

		1-Hour Noise Level Descriptors in dBA					
Site	**Start Time**	**Leq**	**Lmax**	**Lmin**	**L10**	**L50**	**L90**
ML 1	9:00 a.m.	59.4	75.1	38.5	61.8	57.8	48.7
ML 2	9:30 a.m.	52.7	65.9	36.7	56.3	50.8	43.1

Monitoring Locations:

- ML 1: Southeastern portion of project site facing Dehesa Road.
  GPS: 32°47.472'N x 116°50.076'W, EPE 10 ft.
- ML 2: Western portion of project site facing Dehesa Road.
  GPS: 32°47.473'N x 116°50.188'W, EPE 10 ft.

Measurements performed by ISE on September 3, 2008. EPE = Estimated Position Error.

As indicated by the monitoring equipment, at least 90 percent of the time (L90) the onsite sound levels at ML 1 and ML 2 were 48.7 dBA and 43.1 dBA, respectively. The acoustic floor for the site, as seen by the Lmin indicator was found to be 38.5 dBA at ML 1 and 36.7 dBA at ML 2. This would be considered the lowest attainable sound levels for the project area near Dehesa Rd during peak hour traffic times. Currently, the

[6] In conformance with ANSI S1-4 1983 Type 2 and IEC 651 Type 2 standards.

proposed project site would be deemed *acoustically compatible* with the County's noise abatement policies.

1.4 ANALYSIS METHODOLOGY

1.4.1 Traffic Segment Impact Assessment Approach

The *Traffic Noise Model version 2.5* (TNM 2.5) based on FHWA-PD-96-010 and FHWA/CA/TL-87/03 standards was used to calculate future onsite vehicular traffic noise levels. These components are supported by a scientifically founded and experimentally calibrated acoustic computation methodology. The database is made up of over 6,000 individual pass-by events measured at forty sites across the country. Currently TNM 2.5 is the only noise-modeling program accepted by Caltrans for use within the State of California.

The model assumed a 'hard-site' propagation rule (i.e., 3.0 dBA loss per doubling of distance (DD) between source and receiver), thereby yielding a representative worst-case noise contour set.

Propagation Law for a Line Source:

$$dBA_2 = dBA_1 + 10\log_{10}\left(\frac{D_1}{D_2}\right)$$

Where: dBA_1 is the noise level at distance D_1
dBA_2 is the noise level at distance D_2

2.0 NOISE SENSITIVE LAND USES

2.1 Guidelines for the Determination of Significance

The proposed project proposes noise sensitive areas as defined in *Section 1.2.1 Vehicular/Transportation Noise Impact Thresholds* of this report, therefore all noise sensitive areas within Parcel 1 through -4 were analyzed.

2.2 Predicted Traffic Noise Impact Assessment of Noise Sensitive Land Uses

Receptor locations were situated along the property lines closest to major roadways in order to represent the worst-case traffic sound levels across the project site. Receptor elevations were considered five feet above the appropriate floor (noise sensitive areas/patios) elevation for 1st floor predictions as well as 15 feet above appropriate floor elevation for 2nd floor predictions. The receptor locations can be seen in Figure 5 on the following page.

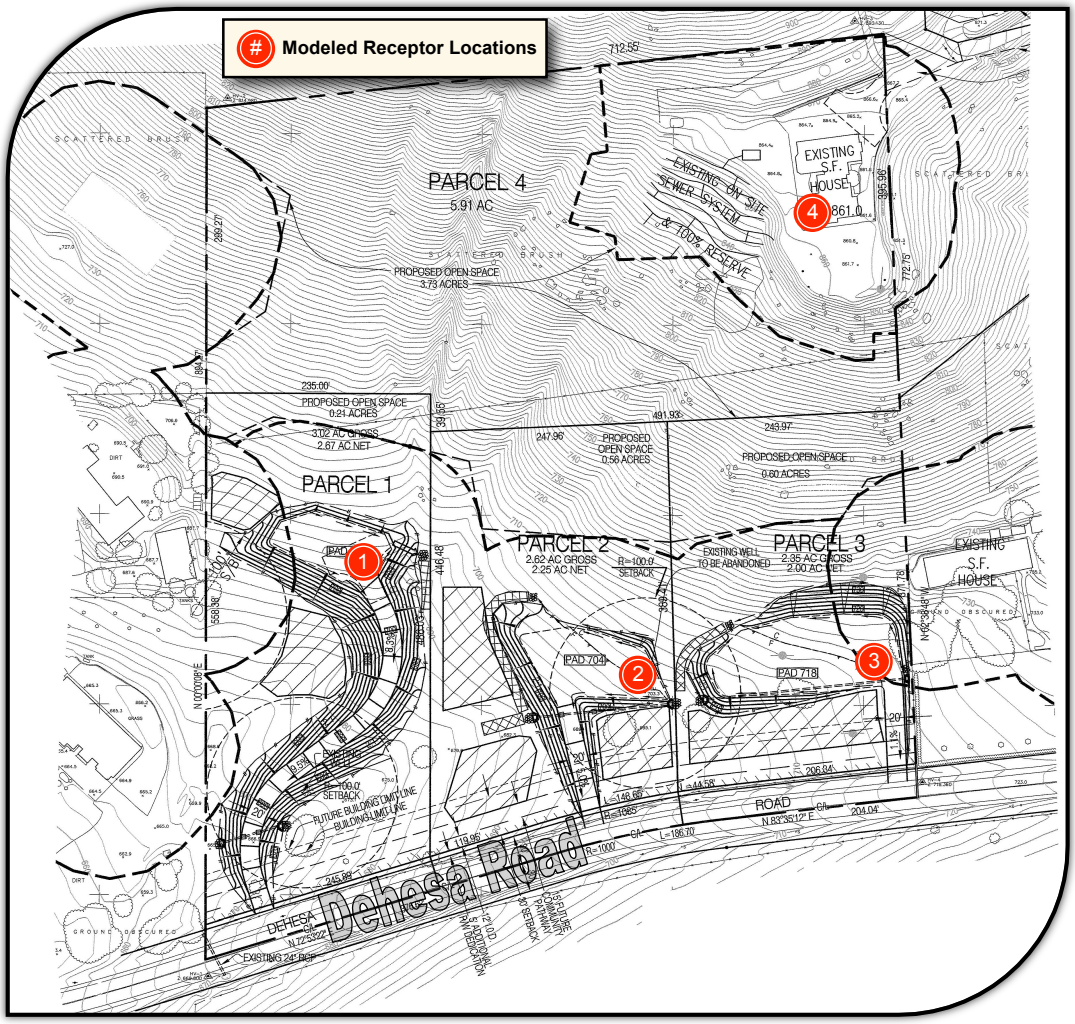


FIGURE 5: Modeled Receptor Locations – Shorees Property TPM 21054R (ISE 9/08)

Input to the acoustical model includes the following:

- A digitized representation of all affected roadways (i.e., *Dehesa Road*).
- Future Average Daily Trips (ADTs) for nearby major roadways.[7]
- A 96/2/2 (automobiles/medium/heavy) traffic mix in accordance with CALTRANS.
- A peak hour traffic percentage of 10% of the ADT.[8]
- Receptor and topographic elevations as identified in the project site plans.[9]

[7] Source: *SANDAG Series 10 – 2030 Enhanced Traffic Prediction Model.*

[8] For values between approximately 8 and 12 percent, the energy-mean A-weighted sound level is equivalent to the CNEL. Outside this range, a maximum variance of up to two dBA occurs between Leq-h and CNEL.

[9] Source: Site Design, 7/08.

The primary sources of future traffic noise near the project site would be from Dehesa Rd. Our project site is identified within zone 13 by SANDAG. Future traffic estimates for this roadway adjacent to our project site predicts volumes for Dehesa Road as high as 21,000 ADT (*Source: SANDAG Series 10 - 2030 Enhanced Traffic Volume Forecast – See Attached*). This volume takes into considerations future developments within traffic analysis zone 13 as predicted by the enhanced traffic model.

The results of the acoustical modeling for all lots are shown below in Table 2. The table output shows the worst-case scenario sound levels for each modeled lot and its resultant second floor. The County's Noise Element classifies that any Noise Sensitive Area (NSA) exceeding 60 dBA must be subject to proper mitigation in order to lower the sound levels below 60 dBA. Based on the results, Parcel 2 through -3 would need some form of mitigation in order to meet the County's NSA threshold and CCR Title 24 noise abatement threshold.

Prior to issuance of building permits for the proposed project, an interior noise analysis compliant with the California Code of Regulations (CCR), Title 24, Noise Insulation Standards would be required for Parcel 2 and Parcel 3. The acoustical analysis should demonstrate that the proposed architectural design would limit interior noise to 45 dBA CNEL or less. Worst-case noise levels, either existing or future, must be used for this determination.

TABLE 2: Predicted Transportation Noise Levels – Shorees Property TPM 21054R

Modeled Receptor No.	Parcel Number	Ground Levels Unmitigated (dBA)	Second Floor Levels (dBA)
1	Parcel 1	54.4	59.5
2	Parcel 2	**63.6**	**65.9**
3	Parcel 3	**64.8**	**66.3**
4	Parcel 4	44.2	47.6

Additionally, the County's Noise Element specifies that 10% of the net lot area per parcel must comply with the County's exterior useable area criterion of 60 dBA CNEL. The designed useable area and unobstructed 60 dBA CNEL noise contour are shown for the two lots with the highest risk of exceeding the County's aforementioned criterion shown in Figure 6a on the following page. The modeled receptor results for these areas can be found in Table 3 on Page 17 of this report.

Based upon these findings, two five-foot high walls would be necessary to mitigate the proposed project's noise usable areas. The placement of these proposed mitigation walls are shown in Figure 6b on Page 16 of this report. These walls should be of solid construction (i.e., such as an earth berm, block or glass or a combination of any of these materials).

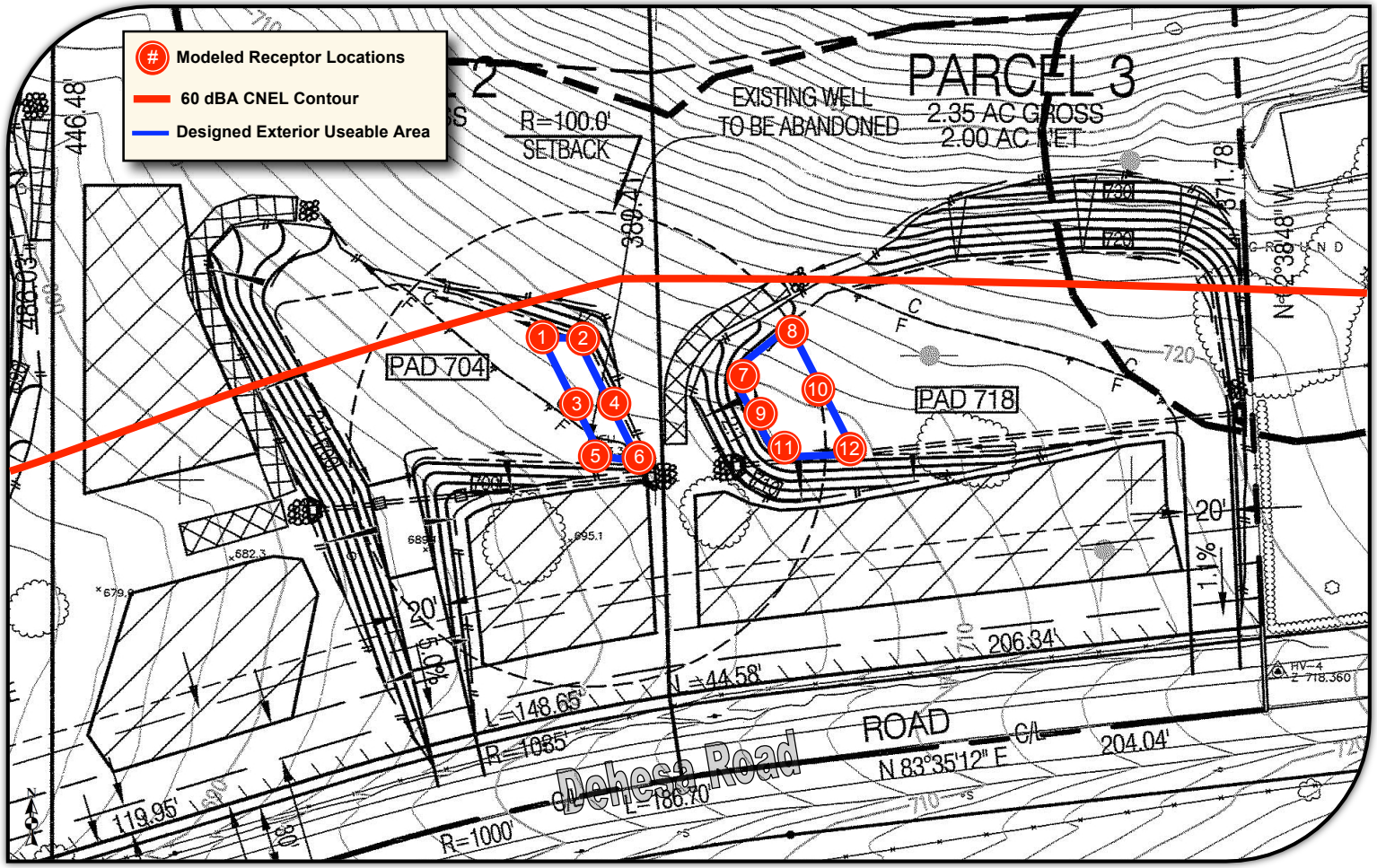


FIGURE 6a: Designed Exterior Useable Areas – Shorees Property TPM 21054R (ISE 9/08)

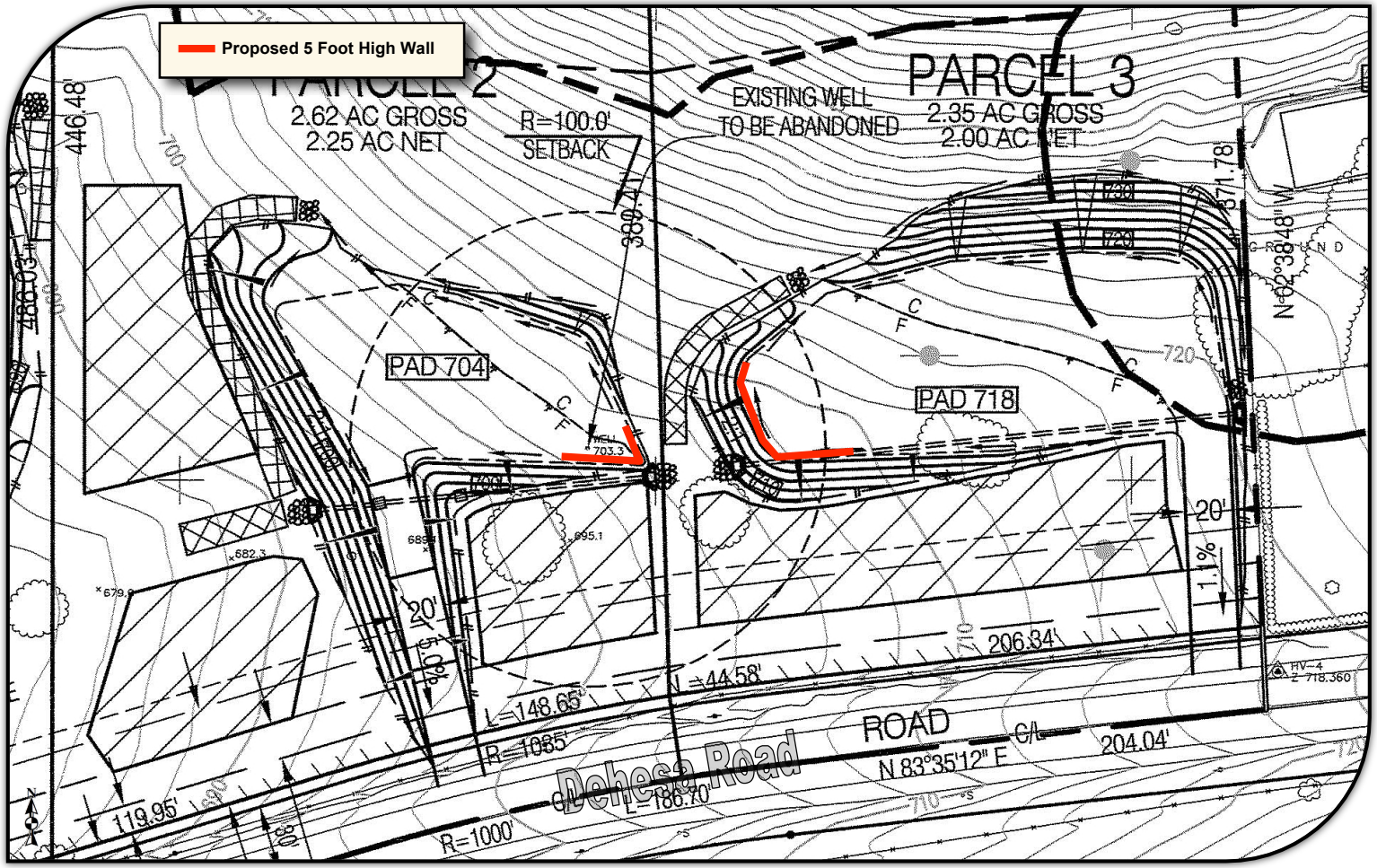


FIGURE 6b: Proposed Wall Locations – Shorees Property TPM 21054R (ISE 9/08)

TABLE 3: Designed Exterior Useable Area Results – Shorees Property TPM 21054R

Modeled Receptor No.	Corresponding Parcel No.	Unmitigated Ground Level (dBA)	Mitigated Ground Level (dBA)
1	Parcel 2 Useable Area NW Corner	59.1	58.5
2	Parcel 2 Useable Area NE Corner	59.2	58.4
3	Parcel 2 Useable Area West	61.2	60.1
4	Parcel 2 Useable Area East	61.2	59.8
5	Parcel 2 Useable Area SW Corner	63.6	59.6
8	Parcel 2 Useable Area SE Corner	63.8	59.4
9	Parcel 3 Useable Area NW Corner	62.1	57.9
10	Parcel 3 Useable Area NE Corner	60.5	58.8
11	Parcel 3 Useable Area West	63.0	57.7
12	Parcel 3 Useable Area East	61.6	58.0
13	Parcel 3 Useable Area SW Corner	64.4	58.4
14	Parcel 3 Useable Area SE Corner	64.6	59.0

3.0 OPERATIONAL ACTIVITIES

3.1 Guidelines for the Determination

The San Diego County Noise Ordinance Section 36.404 governs fixed source and/or operational noise. The applicable sound levels are a function of the time of day and the land use zone. Sound levels are measured at the boundary of the property containing the noise source. The relevant limits are shown in Table 4 on the following page.

In the case where two adjacent property lines differ in zoning, the applicable threshold would be the arithmetic average of the two standards. If the ambient sound levels are consistently higher then zonal property line standards, then the ambient conditions would be the property line standard. This standard would be applied during all hours of operation.

The proposed Shorees Property TPM 21054 development is zoned A-72 (Agriculture). The standard for this zoning would be a one-hour average sound level of 50 dBA between the hours of 7 am and 10 pm and a one-hour average sound level of 45 dBA between the hours of 10 pm and 7 am. Adjacent land uses around the entire project are zoned residential that allows the same standard.

TABLE 4: County of San Diego Noise Ordinance Limits

Land Use Zone	Time of Day	1-Hour Average Sound Level (dBA Leq)
R-S, R-D, R-R, R-MH, A-70, A-72, S-80, S-81, S-87, S-88, S-90, S-92, R-V, and R-U	**7 am to 10 pm 10 pm to 7 am**	**50 45**
R-R0, R-C, R-M, C-30, and S-86	7 am to 10 pm 10 pm to 7 am	55 50
S-94 and other commercial zones	7 am to 10 pm 10 pm to 7 am	60 55
M-50, M-52, and M-54	any time	70
S-82 and M-58	any time	70

Source: County of San Diego Noise Ordinance Section 36.404, 1981.

3.3 Conclusions

Operational noise due to the proposed project will have no significant impacts on the adjacent properties.

4.0 CONSTRUCTION ACTIVITIES

4.1 Guidelines for Determination of Significance

Noise generated by construction activities related to the project will not exceed the standards listed in San Diego County Code Section 36.410, Construction Equipment.

Section 36.410 states:

Except for emergency work,

(a) It shall be unlawful for any person to operate construction equipment between the hours of 7 p.m. of any day and 7 a.m. of the following day.

(b) It shall also be unlawful for any person to operate construction equipment on Sundays, and days appointed by the President, Governor, or the Board of Supervisors for a public fast, Thanksgiving, or holiday, but a person may operate construction equipment on the above-specified days between the hours of 10 a.m. and 5 p.m. at his residence or for the purpose of constructing a residence for himself, provided that the average sound level does not exceed 75 decibels during the period of operation and that the operation of construction equipment is not carried out for profit or livelihood.

(c) It shall also be unlawful to operate any construction equipment so as to cause at or beyond the property line of any property upon which a legal dwelling unit is located an average sound level greater than 75 decibels between the hours of 7 a.m. and 7 p.m.

For temporary activities, the County considers the 75 decibel (A) average to be based on a period of one hour.

4.2 Conclusions

Construction due to the proposed project will have no significant impacts on the adjacent properties.

5.0 GROUND-BORNE VIBRATION AND NOISE IMPACTS

5.1 Guidelines for Determination of Significance

Ground Vibration impact criteria as defined by the County of San Diego is shown below in Table 5.

TABLE 5: County of San Diego Groundborne Vibration Impact Criteria

Land Use Category	Ground-Borne Vibration Impact Levels (inches/sec RMS)		Ground-Borne Noise Impact Levels (dB re 20 micro Pascals)	
	Frequent Events1	Infrequent Events[2]	Frequent[1]	Infrequent Events[2]
Category 1: Building where low ambient vibration is essential for interior operations. (research & manufacturing facilities with special vibration constraints)	0.0018 [3]	0.0018 [3]	Not applicable[5]	Not applicable[5]
Category 2: Residences and buildings where people normally sleep. (hotels, hospitals, residences, & other sleeping facilities)	0.0040	0.010	35 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use. (schools, churches, libraries, other institutions, & quiet offices)	0.0056	0.014	40 dBA	48 dBA

Source: U.S. Department of Transportation, Federal Transit Administration, "Transit Noise and Vibration Impact Assessment," May 2006.

Notes:

1. "Frequent Events" is defined as more than 70 vibration events per day. Most rapid transit projects fall into this category.
2. "Infrequent Events" is defined as fewer than 70 vibration events per day. This category includes most commuter rail systems.
3. This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration sensitive manufacturing or research will require detailed evaluation to define acceptable vibration levels. Ensuring lower vibration levels

in a building often requires special design of the HVAC systems and stiffened floors.

4. Vibration-sensitive equipment is not sensitive to ground-borne noise.
5. There are some buildings, such as concert halls, TV and recording studios, and theaters that can be very sensitive to vibration and noise but do not fit into any of the three categories.
6. For Categories 2 and 3 with occupied facilities, isolated events such as blasting are significant when the peak particle velocity (PPV) exceeds one inch per second. Continuous or frequent intermittent vibration sources such as impact pile drivers are significant when their PPV exceeds 0.1 inch per second. . More specific criteria for structures and potential annoyance were developed by Caltrans (2004) and will be used to evaluate these continuous or transient sources in San Diego County.

5.2 Conclusions

Given the type of project being developed, ground vibration due to the proposed project is not anticipated to have significant impacts on adjacent properties.

6.0 SUMMARY OF PROJECT IMPACTS, MITIGATION & CONCLUSIONS

The proposed Shorees Property TPM 21054 will need to construction two five-foot high mitigation walls for Parcel 2 and Parcel 3 in order to meet the County's *Vehicular/Transportation Noise Impact Threshold*. The proposed project must furthermore demonstrate that once the finalized building design is complete that it will meet the CCR Title 24 abatement threshold.

7.0 LIST OF DESIGN CONSIDERATIONS

The construction of two five-foot high noise walls for Parcel 2 and Parcel 3 as previously indicated in Figure 6b above. The walls should be a minimum of five (5) feet in height as measured from the base pad elevation and be of sufficiently solid construction with a minimum surface density of 3.5 pounds per square foot with no gaps or holes.

8.0 CERTIFIATION OF ACCURACY AND QUALIFICATIONS

This report was prepared by Investigative Science and Engineering, Inc. (ISE). The members of its professional staff contributing to the report are listed below:

Rick Tavares	Ph.D. Civil Engineering
(rtavares@ise.us)	M.S. Structural Engineering
	M.S. Mechanical Engineering
	B.S. Aerospace Engineering / Engineering Mechanics

This report follows the County of San Diego's report formatting guidelines that are different from ISE's standard scientific reporting (MLA variant) format. ISE affirms to the best of its knowledge and belief that the statements and information contained herein are in all respects true and correct as of the date of this report. Should the reader have any questions regarding the findings and conclusions presented in this report, please do not hesitate to contact ISE at (760) 787-0016.

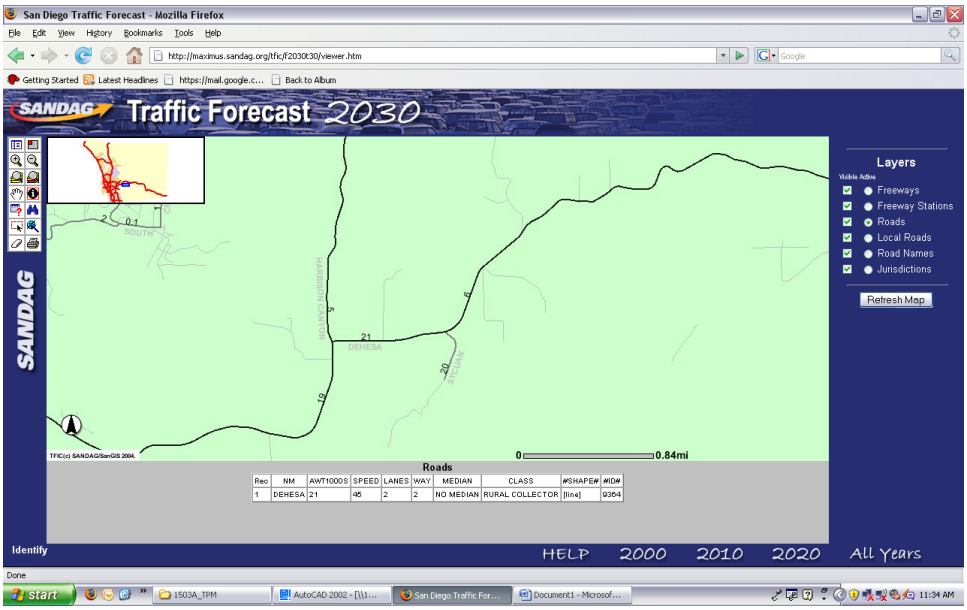
Content and information contained within this report is intended only for the subject project and is protected under 17 U.S.C. §§ 101 through 810. Original reports contain non-photo blue ISE watermark at the bottom of each page.

Approved as to Form and Content:

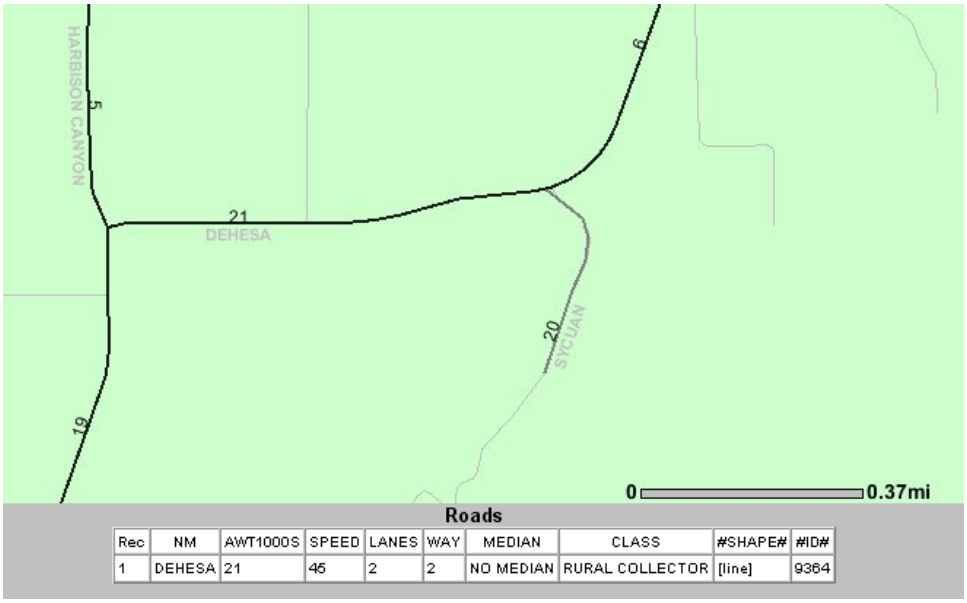
Rick Tavares, Ph.D.
Project Principal
Investigative Science and Engineering, Inc.

APPENDICES / SUPPLEMENTAL INFORMATION

SANDAG 2030 Traffic Forecast Data



SANDAG 2030 Enhanced Traffic Forecast 2030 Attachment – Screenshot by ISE 9-08



Rec	NM	AWT1000S	SPEED	LANES	WAY	MEDIAN	CLASS	#SHAPE#	#ID#
1	DEHESA	21	45	2	2	NO MEDIAN	RURAL COLLECTOR	[line]	9364

SANDAG 2030 Enhanced Traffic Forecast 2030 Attachment – Zoomed Screenshot by ISE 9-08

TNM 2.5 Traffic Noise Model Input/Output Decks

INPUT: ROADWAYS 08-045 Shorees Property TPM 21054R

ISE
Kyle Shimabuku

26 September 2008
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT:
RUN:

08-045 Shorees Property TPM 21054R
Unmitigated

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Dehesa Rd.	24.0	point1	1	3,039.0	3,262.0	650.00				Average	
		point2	2	3,747.0	3,463.0	700.00				Average	
		point3	3	4,261.0	3,525.0	724.00					

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INPUT: TRAFFIC FOR LAeq1h Volumes **08-045 Shorees Property TPM 21054R**

ISE **26 September 2008**

Kyle Shimabuku **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Volumes

PROJECT/CONTRACT: **08-045 Shorees Property TPM 21054R**

RUN: **Unmitigated**

Roadway Name	Points Name	No.	Segment Autos V	S	MTrucks V	S	HTrucks V	S	Buses V	S	Motorcycles V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Dehesa Rd.	point1	1	2016	45	42	45	42	45	0	0	0	0
	point2	2	2016	45	42	45	42	45	0	0	0	0
	point3	3										

INPUT: TERRAIN LINES 08-045 Shorees Property TPM 21054R

ISE 26 September 2008
Kyle Shimabuku TNM 2.5

INPUT: TERRAIN LINES
PROJECT/CONTRACT: 08-045 Shorees Property TPM 21054R
RUN: Unmitigated
Terrain Line Points

Name	No.	Coordinates (ground) X	Y	Z
		ft	ft	ft
Pad 1	1	3,453.0	3,728.0	704.00
	2	3,378.0	3,770.0	704.00
	3	3,390.0	3,792.0	704.00
	4	3,427.0	3,803.0	704.00
	5	3,498.0	3,781.0	704.00
	6	3,453.0	3,727.0	704.00
pad 2	7	3,678.0	3,597.0	704.00
	8	3,640.0	3,672.0	704.00
	9	3,691.0	3,682.0	704.00
	10	3,769.0	3,659.0	704.00
	11	3,795.0	3,607.0	704.00
	12	3,678.0	3,596.0	704.00
Pad 3	13	4,019.0	3,619.0	718.00
	14	3,845.0	3,616.0	718.00
	15	3,839.0	3,651.0	718.00
	16	3,871.0	3,678.0	718.00
	17	4,025.0	3,691.0	718.00
	18	4,019.0	3,620.0	718.00
Pad4	19	4,162.0	4,392.0	896.00
	20	4,152.0	4,484.0	896.00
	21	4,237.0	4,497.0	896.00
	22	4,292.0	4,461.0	896.00
	23	4,269.0	4,427.0	896.00
	24	4,200.0	4,391.0	896.00

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26 Septemb

2

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08-045 Shorees Property TPM 21054R

INPUT: TERRAIN LINES

	25	4,162.0	4,391.0	896.00

INPUT: BARRIERS 08-045 Shorees Property TPM 21054R

ISE 26 September 2008
Kyle Shimabuku TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: 08-045 Shorees Property TPM 21054R
RUN: Mitigated NSA's

Barrier Name	Type	Height Min	Height Max	If Wall $ per Unit Area	If Berm $ per Unit Vol.	Top Width	Run:Rise	Add'tnl $ per Unit Length	Points Name	No.	Coordinates (bottom) X	Coordinates (bottom) Y	Coordinates (bottom) Z	Height at Point	Segment Seg Ht Incre-ment	Perturbs #Up	Perturbs #Dn	On Struct?	Important Reflec-tions?
		ft	ft	$/sq ft	$/cu yd	ft	ft:ft	$/ft			ft	ft	ft	ft	ft				
existing house 1	W	0.00	99.99	0.00				0.00	point7	7	3,940.0	4,108.0	861.00	10.00	0.00	0	0		
									point8	8	3,994.0	4,114.0	861.00	10.00	0.00	0	0		
									point9	9	3,993.0	4,200.0	861.00	10.00	0.00	0	0		
									point10	10	3,928.0	4,193.0	861.00	10.00	0.00	0	0		
									point11	11	3,940.0	4,107.0	861.00	10.00					
Barrier5	W	0.00	99.99	0.00				0.00	point12	12	3,835.4	3,642.5	718.00	5.00	0.00	0	0		
									point34	34	3,839.9	3,625.5	718.00	5.00	0.00	0	0		
									point13	13	3,850.7	3,608.7	718.00	5.00	0.00	0	0		
									point14	14	3,890.7	3,611.7	718.00	5.00					
Barrier6	W	0.00	99.99	0.00				0.00	point15	15	3,764.4	3,604.2	704.00	5.00	0.00	0	0		
									point16	16	3,796.5	3,606.0	704.00	5.00	0.00	0	0		
									point17	17	3,788.0	3,621.4	704.00	5.00					
Barrier8	W	0.00	99.99	0.00				0.00	point18	19	4,068.0	3,723.0	735.00	10.00	0.00	0	0		
									point19	20	4,177.0	3,744.0	735.00	10.00	0.00	0	0		
									point20	21	4,170.0	3,776.0	735.00	10.00	0.00	0	0		
									point21	22	4,062.0	3,755.0	735.00	10.00	0.00	0	0		
									point22	23	4,068.0	3,724.0	735.00	10.00					
Barrier9	W	0.00	99.99	0.00				0.00	point23	24	4,235.0	3,704.0	736.00	10.00	0.00	0	0		
									point24	25	4,280.0	3,706.0	736.00	10.00	0.00	0	0		
									point25	26	4,276.0	3,752.0	736.00	10.00	0.00	0	0		
									point26	27	4,232.0	3,752.0	736.00	10.00	0.00	0	0		
									point27	28	4,235.0	3,705.0	736.00	10.00					
Barrier10	W	0.00	99.99	0.00				0.00	point28	29	3,207.0	3,521.0	365.00	10.00	0.00	0	0		
									point29	30	3,244.0	3,555.0	365.00	10.00	0.00	0	0		
									point30	31	3,166.0	3,628.0	365.00	10.00	0.00	0	0		
									point31	32	3,136.0	3,595.0	365.00	10.00	0.00	0	0		
									point32	33	3,207.0	3,522.0	365.00	10.00					

INPUT: RECEIVERS 08-045 Shorees Property TPM 21054R

ISE 26 September 2008
Kyle Shimabuku TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: 08-045 Shorees Property TPM 21054R
RUN: Unmitigated

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
Parcel 3	34	1	4,003.1	3,622.1	718.00	4.92	0.00	66	10.0	8.0	Y
Parcel 2	35	1	3,776.7	3,608.6	704.00	4.92	0.00	66	10.0	8.0	Y
Parcel 1	36	1	3,449.4	3,738.7	704.00	4.92	0.00	66	10.0	8.0	Y
Parcel 4	37	1	4,173.3	4,399.3	895.00	4.92	0.00	66	10.0	8.0	Y
60 contour	53	1	4,208.8	3,689.8	733.00	4.92	0.00	66	10.0	8.0	Y
60 contour	58	1	3,788.0	3,692.2	714.00	4.92	0.00	66	10.0	8.0	Y
60 contour	62	1	3,161.7	3,482.2	661.00	4.92	0.00	66	10.0	8.0	Y

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RESULTS: SOUND LEVELS **08-045 Shorees Property TPM 21054R**

ISE **26 September 2008**
Kyle Shimabuku **TNM 2.5**
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: **08-045 Shorees Property TPM 21054R**
RUN: **Unmitigated**
BARRIER DESIGN: **INPUT HEIGHTS**
Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.
ATMOSPHERICS: **68 deg F, 50% RH**

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Parcel 3	34	1	0.0	64.8	66	64.8	10	----	64.8	0.0	8	-8.0
Parcel 2	35	1	0.0	63.6	66	63.6	10	----	63.6	0.0	8	-8.0
Parcel 1	36	1	0.0	54.4	66	54.4	10	----	54.4	0.0	8	-8.0
Parcel 4	37	1	0.0	44.2	66	44.2	10	----	44.2	0.0	8	-8.0
60 contour	53	1	0.0	60.0	66	60.0	10	----	60.0	0.0	8	-8.0
60 contour	58	1	0.0	59.9	66	59.9	10	----	59.9	0.0	8	-8.0
60 contour	62	1	0.0	60.1	66	60.1	10	----	60.1	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min dB	Avg dB	Max dB
All Selected	7	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

INPUT: RECEIVERS 08-045 Shorees Property TPM 21054R

ISE 26 September 2008
Kyle Shimabuku TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: 08-045 Shorees Property TPM 21054R
RUN: Unmitigated

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
Parcel 3	34	1	4,003.1	3,622.1		718.00	15.00	0.00	66	10.0	8.0 Y
Parcel 2	35	1	3,776.7	3,608.6		704.00	15.00	0.00	66	10.0	8.0 Y
Parcel 1	36	1	3,449.4	3,738.7		704.00	15.00	0.00	66	10.0	8.0 Y
Parcel 4	37	1	4,173.3	4,399.3		895.00	15.00	0.00	66	10.0	8.0 Y
60 contour	53	1	4,208.8	3,689.8		733.00	4.92	0.00	66	10.0	8.0 Y
60 contour	58	1	3,788.0	3,692.2		714.00	4.92	0.00	66	10.0	8.0 Y
60 contour	62	1	3,161.7	3,482.2		661.00	4.92	0.00	66	10.0	8.0 Y

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RESULTS: SOUND LEVELS **08-045 Shorees Property TPM 21054R**

ISE **26 September 2008**
Kyle Shimabuku **TNM 2.5**
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: **08-045 Shorees Property TPM 21054R**
RUN: **Unmitigated**
BARRIER DESIGN: **INPUT HEIGHTS**
Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.
ATMOSPHERICS: **68 deg F, 50% RH**

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Parcel 3	34	1	0.0	66.3	66	66.3	10	Snd Lvl	66.3	0.0	8	-8.0
Parcel 2	35	1	0.0	65.9	66	65.9	10	----	65.9	0.0	8	-8.0
Parcel 1	36	1	0.0	59.5	66	59.5	10	----	59.5	0.0	8	-8.0
Parcel 4	37	1	0.0	47.6	66	47.6	10	----	47.6	0.0	8	-8.0
60 contour	53	1	0.0	60.0	66	60.0	10	----	60.0	0.0	8	-8.0
60 contour	58	1	0.0	59.9	66	59.9	10	----	59.9	0.0	8	-8.0
60 contour	62	1	0.0	60.1	66	60.1	10	----	60.1	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min dB	Noise Reduction Avg dB	Noise Reduction Max dB
All Selected	7	0.0	0.0	0.0
All Impacted	1	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

ISE 26 September 2008
Kyle Shimabuku TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: 08-045 Shorees Property TPM 21054R
RUN: Unmitigated NSA

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
Parcel 3 Usable Southwest	34	1	3,852.0	3,612.0	718.00	4.92	0.00	66	10.0	8.0	Y
Parcel 2 Usable Northwest	35	1	3,756.0	3,658.0	704.00	4.92	0.00	66	10.0	8.0	Y
Receiver36	36	1	3,427.1	3,789.0	704.00	4.92	0.00	66	10.0	8.0	Y
Receiver37	37	1	4,173.3	4,399.3	895.00	4.92	0.00	66	10.0	8.0	Y
Receiver53	53	1	4,208.8	3,689.8	733.00	4.92	0.00	66	10.0	8.0	Y
Receiver58	58	1	3,788.0	3,692.2	714.00	4.92	0.00	66	10.0	8.0	Y
Receiver62	62	1	3,161.7	3,482.2	661.00	4.92	0.00	66	10.0	8.0	Y
Receiver66	66	1	3,939.6	4,102.4	861.00	4.92	0.00	66	10.0	8.0	Y
Parcel 2 Usable Northeast	68	1	3,770.0	3,658.0	704.00	4.92	0.00	66	10.0	8.0	Y
Parcel 2 Usable East	69	1	3,781.0	3,635.0	704.00	4.92	0.00	66	10.0	8.0	Y
Parcel 2 Usable Southwest	70	1	3,780.0	3,609.0	704.00	4.92	0.00	66	10.0	8.0	Y
Parcel 2 Usable Southeast	71	1	3,794.0	3,609.0	704.00	4.92	0.00	66	10.0	8.0	Y
Parcel 3 Usable Northwest	72	1	3,837.0	3,643.4	718.00	4.92	0.00	66	10.0	8.0	Y
Parcel 3 Usable Northeast	73	1	3,854.0	3,663.0	718.00	4.92	0.00	66	10.0	8.0	Y
Parcel 3 Usable East	74	1	3,867.0	3,638.0	718.00	4.92	0.00	66	10.0	8.0	Y
Parcel 3 Usable West	75	1	3,842.0	3,627.0	718.00	4.92	0.00	66	10.0	8.0	Y
Parcel 2 Usable West	77	1	3,768.0	3,634.0	704.00	4.92	0.00	66	10.0	8.0	Y
Parcel 3 Usable Southeast	79	1	3,882.0	3,613.0	718.00	4.92	0.00	66	10.0	8.0	Y

RESULTS: SOUND LEVELS **08-045 Shorees Property TPM 21054R**

ISE **26 September 2008**
Kyle Shimabuku **TNM 2.5**
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: **08-045 Shorees Property TPM 21054R**
RUN: **Unmitigated NSA**
BARRIER DESIGN: **INPUT HEIGHTS**
Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.
ATMOSPHERICS: **68 deg F, 50% RH**

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Parcel 3 Usable Southwest	34	1	0.0	64.4	66	64.4	10	----	64.4	0.0	8	-8.0
Parcel 2 Usable Northwest	35	1	0.0	59.1	66	59.1	10	----	59.1	0.0	8	-8.0
Receiver36	36	1	0.0	52.4	66	52.4	10	----	52.4	0.0	8	-8.0
Receiver37	37	1	0.0	44.2	66	44.2	10	----	44.2	0.0	8	-8.0
Receiver53	53	1	0.0	60.0	66	60.0	10	----	60.0	0.0	8	-8.0
Receiver58	58	1	0.0	59.9	66	59.9	10	----	59.9	0.0	8	-8.0
Receiver62	62	1	0.0	60.1	66	60.1	10	----	60.1	0.0	8	-8.0
Receiver66	66	1	0.0	51.8	66	51.8	10	----	51.8	0.0	8	-8.0
Parcel 2 Usable Northeast	68	1	0.0	59.2	66	59.2	10	----	59.2	0.0	8	-8.0
Parcel 2 Usable East	69	1	0.0	61.2	66	61.2	10	----	61.2	0.0	8	-8.0
Parcel 2 Usable Southwest	70	1	0.0	63.6	66	63.6	10	----	63.6	0.0	8	-8.0
Parcel 2 Usable Southeast	71	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
Parcel 3 Usable Northwest	72	1	0.0	62.1	66	62.1	10	----	62.1	0.0	8	-8.0
Parcel 3 Usable Northeast	73	1	0.0	60.5	66	60.5	10	----	60.5	0.0	8	-8.0
Parcel 3 Usable East	74	1	0.0	61.6	66	61.6	10	----	61.6	0.0	8	-8.0
Parcel 3 Usable West	75	1	0.0	63.0	66	63.0	10	----	63.0	0.0	8	-8.0
Parcel 2 Usable West	77	1	0.0	61.2	66	61.2	10	----	61.2	0.0	8	-8.0
Parcel 3 Usable Southeast	79	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min dB	Noise Reduction Avg dB	Noise Reduction Max dB
All Selected	18	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0

RESULTS: SOUND LEVELS
All that meet NR Goal

08-045 Shorees Property TPM 21054R

0	0.0	0.0	0.0	

26 September 2008

2

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INPUT: BARRIERS 08-045 Shorees Property TPM 21054R

ISE
Kyle Shimabuku

26 September 2008
TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: 08-045 Shorees Property TPM 21054R
RUN: Mitigated NSA's

Barrier Name	Type	Height Min	Height Max	If Wall $ per Unit Area	If Berm $ per Unit Vol.	If Berm Top Width	Run:Rise	Add'tnl $ per Unit Length	Points Name	No.	Coordinates (bottom) X	Coordinates (bottom) Y	Coordinates (bottom) Z	Height at Point	Segment Seg Ht Incre-ment	Perturbs #Up	Perturbs #Dn	On Struct?	Important Reflec-tions?
		ft	ft	$/sq ft	$/cu yd	ft	ft:ft	$/ft			ft	ft	ft	ft	ft				
existing house 1	W	0.00	99.99	0.00				0.00	point7	7	3,940.0	4,108.0	861.00	10.00	0.00	0	0		
									point8	8	3,994.0	4,114.0	861.00	10.00	0.00	0	0		
									point9	9	3,993.0	4,200.0	861.00	10.00	0.00	0	0		
									point10	10	3,928.0	4,193.0	861.00	10.00	0.00	0	0		
									point11	11	3,940.0	4,107.0	861.00	10.00					
Barrier5	W	0.00	99.99	0.00				0.00	point12	12	3,835.4	3,642.5	718.00	5.00	0.00	0	0		
									point34	34	3,839.9	3,625.5	718.00	5.00	0.00	0	0		
									point13	13	3,850.7	3,608.7	718.00	5.00	0.00	0	0		
									point14	14	3,890.7	3,611.7	718.00	5.00					
Barrier6	W	0.00	99.99	0.00				0.00	point15	15	3,764.4	3,604.2	704.00	5.00	0.00	0	0		
									point16	16	3,796.5	3,606.0	704.00	5.00	0.00	0	0		
									point17	17	3,788.0	3,621.4	704.00	5.00					
Barrier8	W	0.00	99.99	0.00				0.00	point18	19	4,068.0	3,723.0	735.00	10.00	0.00	0	0		
									point19	20	4,177.0	3,744.0	735.00	10.00	0.00	0	0		
									point20	21	4,170.0	3,776.0	735.00	10.00	0.00	0	0		
									point21	22	4,062.0	3,755.0	735.00	10.00	0.00	0	0		
									point22	23	4,068.0	3,724.0	735.00	10.00					
Barrier9	W	0.00	99.99	0.00				0.00	point23	24	4,235.0	3,704.0	736.00	10.00	0.00	0	0		
									point24	25	4,280.0	3,706.0	736.00	10.00	0.00	0	0		
									point25	26	4,276.0	3,752.0	736.00	10.00	0.00	0	0		
									point26	27	4,232.0	3,752.0	736.00	10.00	0.00	0	0		
									point27	28	4,235.0	3,705.0	736.00	10.00					
Barrier10	W	0.00	99.99	0.00				0.00	point28	29	3,207.0	3,521.0	365.00	10.00	0.00	0	0		
									point29	30	3,244.0	3,555.0	365.00	10.00	0.00	0	0		
									point30	31	3,166.0	3,628.0	365.00	10.00	0.00	0	0		
									point31	32	3,136.0	3,595.0	365.00	10.00	0.00	0	0		
									point32	33	3,207.0	3,522.0	365.00	10.00					

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INPUT: RECEIVERS **08-045 Shorees Property TPM 21054R**

ISE **26 September 2008**
Kyle Shimabuku **TNM 2.5**

INPUT: RECEIVERS
PROJECT/CONTRACT: **08-045 Shorees Property TPM 21054R**
RUN: **Mitigated NSA's**

Receiver Name	No.	#DUs	Coordinates (ground) X		Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h		Impact Criteria LAeq1h	Sub'l	NR Goal	Active in Calc.
			ft		ft	ft	ft	dBA		dBA	dB	dB	
Parcel 3 Usable Southwest	34	1	3,852.0		3,612.0		718.00	4.92	0.00	66		10.0	8.0 Y
Parcel 2 Usable Northwest	35	1	3,756.0		3,658.0		704.00	4.92	0.00	66		10.0	8.0 Y
Receiver36	36	1	3,427.1		3,789.0		704.00	4.92	0.00	66		10.0	8.0 Y
Receiver37	37	1	4,173.3		4,399.3		895.00	4.92	0.00	66		10.0	8.0 Y
Receiver53	53	1	4,208.8		3,689.8		733.00	4.92	0.00	66		10.0	8.0 Y
Receiver58	58	1	3,788.0		3,692.2		714.00	4.92	0.00	66		10.0	8.0 Y
Receiver62	62	1	3,161.7		3,482.2		661.00	4.92	0.00	66		10.0	8.0 Y
Receiver66	66	1	3,939.6		4,102.4		861.00	4.92	0.00	66		10.0	8.0 Y
Parcel 2 Usable Northeast	68	1	3,770.0		3,658.0		704.00	4.92	0.00	66		10.0	8.0 Y
Parcel 2 Usable East	69	1	3,781.0		3,635.0		704.00	4.92	0.00	66		10.0	8.0 Y
Parcel 2 Usable Southwest	70	1	3,780.0		3,609.0		704.00	4.92	0.00	66		10.0	8.0 Y
Parcel 2 Usable Southeast	71	1	3,794.0		3,609.0		704.00	4.92	0.00	66		10.0	8.0 Y
Parcel 3 Usable Northwest	72	1	3,837.0		3,643.4		718.00	4.92	0.00	66		10.0	8.0 Y
Parcel 3 Usable Northeast	73	1	3,854.0		3,663.0		718.00	4.92	0.00	66		10.0	8.0 Y
Parcel 3 Usable East	74	1	3,867.0		3,638.0		718.00	4.92	0.00	66		10.0	8.0 Y
Parcel 3 Usable West	75	1	3,842.0		3,627.0		718.00	4.92	0.00	66		10.0	8.0 Y
Parcel 2 Usable West	77	1	3,768.0		3,634.0		704.00	4.92	0.00	66		10.0	8.0 Y
Parcel 3 Usable Southeast	79	1	3,882.0		3,613.0		718.00	4.92	0.00	66		10.0	8.0 Y

RESULTS: SOUND LEVELS **08-045 Shorees Property TPM 21054R**

ISE **26 September 2008**
Kyle Shimabuku **TNM 2.5**
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: **08-045 Shorees Property TPM 21054R**
RUN: **Mitigated NSA's**
BARRIER DESIGN: **INPUT HEIGHTS**
Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

ATMOSPHERICS: **68 deg F, 50% RH**

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Parcel 3 Usable Southwest	34	1	0.0	58.4	66	58.4	10	----	58.4	0.0	8	-8.0
Parcel 2 Usable Northwest	35	1	0.0	58.5	66	58.5	10	----	58.5	0.0	8	-8.0
Receiver36	36	1	0.0	52.3	66	52.3	10	----	52.3	0.0	8	-8.0
Receiver37	37	1	0.0	44.2	66	44.2	10	----	44.2	0.0	8	-8.0
Receiver53	53	1	0.0	60.0	66	60.0	10	----	60.0	0.0	8	-8.0
Receiver58	58	1	0.0	59.9	66	59.9	10	----	59.9	0.0	8	-8.0
Receiver62	62	1	0.0	60.1	66	60.1	10	----	60.1	0.0	8	-8.0
Receiver66	66	1	0.0	51.8	66	51.8	10	----	51.8	0.0	8	-8.0
Parcel 2 Usable Northeast	68	1	0.0	58.4	66	58.4	10	----	58.4	0.0	8	-8.0
Parcel 2 Usable East	69	1	0.0	59.8	66	59.8	10	----	59.8	0.0	8	-8.0
Parcel 2 Usable Southwest	70	1	0.0	59.6	66	59.6	10	----	59.6	0.0	8	-8.0
Parcel 2 Usable Southeast	71	1	0.0	59.4	66	59.4	10	----	59.4	0.0	8	-8.0
Parcel 3 Usable Northwest	72	1	0.0	57.9	66	57.9	10	----	57.9	0.0	8	-8.0
Parcel 3 Usable Northeast	73	1	0.0	58.8	66	58.8	10	----	58.8	0.0	8	-8.0
Parcel 3 Usable East	74	1	0.0	58.0	66	58.0	10	----	58.0	0.0	8	-8.0
Parcel 3 Usable West	75	1	0.0	57.7	66	57.7	10	----	57.7	0.0	8	-8.0
Parcel 2 Usable West	77	1	0.0	60.1	66	60.1	10	----	60.1	0.0	8	-8.0
Parcel 3 Usable Southeast	79	1	0.0	59.0	66	59.0	10	----	59.0	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min dB	Noise Reduction Avg dB	Noise Reduction Max dB
All Selected	18	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0

INDEX OF IMPORTANT TERMS